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EXAMINER
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WILKINS III, HARRY D

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/673,816  
Filing Date: September 29, 2003  
Appellant(s): HARRINGTON ET AL.

**MAILED**  
**JUN 12 2007**  
**GROUP 1700**

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Joseph T. Guy  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 21 March 2007 appealing from the Office action mailed 18 August 2006.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

No amendment after final has been filed.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

US 5,837,121	KINARD et al	11-1998
US 4,481,083	BALL et al	11-1984

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

[The Examiner wishes to apologize to Appellant as the rejection grounds presented by the Examiner in the final rejection mailed 18 August 2006 were less than clear in setting forth the grounds of rejection. The Examiner has attempted to clarify the rejection grounds below, providing more detail with respect to the present claims and the teachings of the references.]

---Claims 1-15 and 19-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kinard et al (US 5,837,121) in view of Ball et al (US 4,481,083).

Kinard et al teach (see abstract, col. 1, line 4 to col. 4, line 6 and col. 4, lines 30-38) a method for preparing an anode plate for a capacitor including the steps of fabricating an aluminum plate, contacting the plate with an anodizing solution comprising glycerin, low amounts of water (less than 1000 ppm), and 0.1-15 wt% dibasic potassium phosphate and a final step of anodizing the aluminum plate.

By unit conversion, the 1000ppm of water of Kinard et al is equivalent to 0.1 wt% of water. Thus, Appellant's lower claimed limit of about 0.1 wt% is considered to be met by Kinard et al. Appellant has failed to show

Alternatively, Kinard et al teach examples of anodizing using "freshly prepared" glycerine solution, and describes the water content of those solutions as approximately 3000 ppm (see Examples 4 and 5).

Kinard et al teaches examples where the anodization was carried out at up to 15 volts. Thus, Kinard et al fail to expressly teach anodizing at more than 220 volts.

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However, Kinard et al does teach (see col. 1, lines 12-20 and col. 5, lines 24-26) that the thickness of the formed anodized layer and/or the rate of anodization was proportional to the applied voltage. Kinard et al also teach that the thicker the anodized layer was, the higher the operating voltage of the formed capacitor.

Therefore, it would have been obvious to one of ordinary skill in the art to have increased the applied voltage to have increased the thickness of the formed anodized oxide layer and/or the rate of oxide layer formation so that the formed capacitor could have been made to have a higher operating voltage and/or created more quickly.

Kinard et al fail to teach the "pre-hydrating" step.

However, Ball et al teach (see col. 1, lines 5-64) that in order for thicker anodized oxide layers to be formed (i.e.-those for higher voltage capacitors), the initial oxide layer on the aluminum must be "depolarized", which in the prior art was done by immersion in hot water prior to anodizing (i.e.-pre-hydrating).

Therefore, it would have been obvious to one of ordinary skill in the art to have performed a pre-hydrating step as taught by Ball et al in the process of Kinard et al for forming the high voltage capacitor because the pre-hydrating step allowed "depolarization" of the existing surface oxide layer enabling the thicker anodized oxide layer to be formed.

Regarding claim 2, Kinard et al teach (see col. 1, lines 38-40) that prior to anodizing the aluminum was etched to increase surface area.

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Regarding claim 3, Kinard et al teach (see col. 1, lines 38-45) that in conventional anodizing the voltage applied was increased in increments with periods in multiple tanks at each level of voltage.

Regarding claims 4-5, it would have been obvious to one of ordinary skill in the art to have optimized the increments in the process to ensure proper anodic film formation while balancing reduced treatment time.

Regarding claim 6-8, it would have been obvious to one of ordinary skill in the art to have optimized the duration of each increment in the process to ensure proper anodic film formation while balancing reduced treatment time. Since the current decreases with time at a constant voltage, the duration of each increment was indicative of an expected current decrease.

Regarding claims 9-10, Kinard et al teach anodizing at 80-90°C (see example 5) for "freshly prepared" solution. One of ordinary skill in the art would have been led to use the same temperature for the "freshly prepared" glycerin solution.

Regarding claim 11, Kinard et al teach a lower limit of phosphate of 0.1 wt%.

Regarding claims 12-13, Kinard et al teach using dibasic potassium phosphate.

Regarding claim 14, Kinard et al admit that dibasic potassium phosphate was chosen due to its solubility in glycerin. The phosphate was the desired reagent which produced improved results. Therefore, it would have been considered routine experimentation, and, thus, obvious, to one of ordinary skill in the art to have substituted other soluble phosphate salts for the potassium phosphate, such as ammonium phosphate.

Regarding claim 15, Kinard et al suggest using "freshly prepared" glycerine solution which, by mere exposure to the atmosphere contained about 3000 ppm (0.3 wt%) of water.

Regarding claim 19, Kinard et al teach (see col. 1, lines 38-45) that in conventional anodizing the voltage applied was increased in increments with periods in multiple tanks at each level of voltage. It would have been obvious to one of ordinary skill in the art to have optimized the duration of each increment in the process to ensure proper anodic film formation while balancing reduced treatment time. Since the current decreases with time at a constant voltage, the duration of each increment was indicative of an expected current decrease.

Regarding claim 20, Kinard et al teach (see col. 1, lines 38-40) that prior to anodizing, the aluminum was etched to increase surface area.

Regarding claim 21, Kinard et al suggests using higher final voltages for achieving thicker anodized oxide layer thereby imparting a higher capacitor operating voltage.

Regarding claims 22-23, it would have been obvious to one of ordinary skill in the art to have optimized the increments in the process to ensure proper anodic film formation while balancing reduced treatment time.

Regarding claim 24-26, it would have been obvious to one of ordinary skill in the art to have optimized the duration of each increment in the process to ensure proper anodic film formation while balancing reduced treatment time. Since the current

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decreases with time at a constant voltage, the duration of each increment was indicative of an expected current decrease.

Regarding claims 27-28, Kinard et al teach anodizing at 80-90°C (see example 5) for “freshly prepared” solution. One of ordinary skill in the art would have been led to use the same temperature for the “freshly prepared” glycerin solution.

Regarding claim 29, Kinard et al teach a lower limit of phosphate of 0.1 wt%.

Regarding claims 30-31, Kinard et al teach using dibasic potassium phosphate.

Regarding claim 32, Kinard et al admit that dibasic potassium phosphate was chosen due to its solubility in glycerin. The phosphate was the desired reagent which produced improved results. Therefore, it would have been considered routine experimentation, and, thus, obvious, to one of ordinary skill in the art to have substituted other soluble phosphate salts for the potassium phosphate, such as ammonium phosphate.

#### **(10) Response to Argument**

Appellant has argued that:

(a) Kinard et al fails to meet the claimed water content of the glycerine solution.

In response, it is noted that Appellant’s claim recites “*about* 0.1 to about 2.0% by weight” of water (emphasis added). Thus, a recitation of less than 1000 ppm (0.1 wt%) in Kinard et al is sufficient to meet the presently claimed range because 999 ppm (0.099 wt%) is *about* 0.1 wt%. The two ranges share an endpoint. Appellant has failed to provide comparison results showing any unexpected results from using the presently claimed range compared to the range disclosed by Kinard et al.



Alternatively, Kinard et al teaches that another technically feasible, although not desired, process for anodization could have been performed with freshly made glycerin solution, which contained 3000 ppm water (0.3 wt%). Although Kinard et al mention that using higher water results in typical "limiting thickness" anodization, such teaching is not to be construed as a teaching away by Kinard et al because Kinard et al teach that the "limiting thickness" anodization is completely viable to produce anodic oxide films, although the oxide films were not as thick as those produced with the "non-limiting thickness" anodization utilizing glycerine solutions with less than 1000 ppm water.

(b) "Unheated glycerine will greatly exceed 2% water which is in direct contradiction to the inherency argument relied on by the Examiner".

In response, it appears that the term used by the Examiner, "unheated", is unfortunately not entirely accurate. More properly it should have been "freshly prepared" as was utilized by Kinard et al. Kinard et al teaches (see col. 8, lines 60-63) that the "freshly prepared" glycerine solution contained approximately 3000 ppm water.

(c) Kinard et al fail to teach or suggest increasing the applied voltage to more than 220 volts.

In response, (1) Kinard et al teach (see col. 1, lines 12-20) that in "limiting thickness" anodization, the applied voltage was proportional to the oxide film layer thickness formed by the anodization. (2) Kinard et al teach (see col. 5, lines 24-26) that in "non-limiting thickness" anodization, the applied voltage was proportional to the rate of oxide film formation. Thus, Kinard et al teach that in either "limiting thickness" or "non-limiting thickness" anodization, the applied voltage was a known result effective

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variable. Applicant has failed to provide a showing of unexpected results based on the currently claimed applied voltage in comparison to the voltages applied by Kinard et al.

(d) Further, Appellant argues that Kinard et al teach in col. 2, lines 3-8 and col. 5, lines 37-40 that the direct correlation between thickness and operating voltage is not believed to be clearly stated in Kinard et al.

In response, with respect to "limiting thickness" anodization:

When biased positive in appropriate (i.e. non-corrosive) aqueous or partially aqueous electrolytes, typical valve metals, such as aluminum or tantalum become coated with a dielectric film of uniform thickness. At constant temperature, the film thickness is proportional to the applied voltage and the rate of film growth is directly proportional to the current density. These properties are described at length in L. Young's book, "Anodic Oxide Films" (1961, Academic Press, London).

(col. 1, lines 12-20)

Upon application of suitable cathode contacts, anode materials covered with anodic films as described above, become positive capacitor "plates" in polar capacitors in which the anodic film serves as the dielectric. These devices are characterized by a relatively high capacitance per unit volume and relatively low cost per unit of capacitance compared with electrostatic capacitors.

(col. 1, lines 56-62)

Thus, for increased volume of oxide film (i.e.-thicker oxide film) the operating capacitance goes up. Hence, oxide film thickness is a result effective variable. Since the film thickness is proportional to the applied voltage, the applied voltage is also a result effective variable.

With respect to "non-thickness limiting" anodization:

Film growth rate is dependent on applied voltage with the electrolytes and anodizing conditions of the present invention. Tantalum powder metallurgy capacitor anode bodies

(col. 5, lines 24-26)

Thus, the rate at which the oxide film grows is directly controlled by the applied voltage. Thus, the applied voltage was a result effective variable.

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(e) Ball et al teach the pre-hydrating step only in the context of an anodizing electrolyte containing boric acid and 2-50 ppm phosphate.

In response, [from Bell et al]:

It has been customary to form a hydrous oxide layer on aluminum foil prior to anodization of the foil for service above about 200 V. Usually this hydrous oxide layer is formed by passing the foil into boiling deionized water. This layer permits anodization to above 200 V and permits power savings during anodization and a higher capacitance per given anodization voltages. Al- (col. 1, lines 24-30)

Ball et al teaches the pre-hydrating step absent the context of their inventive anodizing solution. Thus, since the pre-hydrating step was conventional in the prior art, particularly when making high-voltage capacitors, for the purpose of permitting anodization above 200 V and creating power savings, it would have been obvious to one of ordinary skill in the art to have applied the conventional pre-hydrating step to the process of Kinard et al.

#### **(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

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For the above reasons, it is believed that the rejections should be sustained.


Respectfully submitted,



Harry D. Wilkins, III  
Primary Examiner  
Art Unit 1742

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